3-D Image → Digital Camera

2-Dimintional Document → Scanner

Graphical Software → Computer

Digital Camera, Scanner, Computer → Digital Representation → Digital File

Digital File → View (Display), Print

Digital File ↔ Graphical Editing Software

A Digital Image is a numeric representation, usually binary, of a two-dimensional image.

Creating Digital Images

- Scanner
- Camera
- "Born Digital"

Picture Element (Pixel) – Smallest element of a digital image

- Fewer Pixels – Low Resolution Image
- More Pixels – High Resolution Image

Aspect Ratio – Ratio of the Width versus the Height of a digital image

Image Types

- Black and White
    - Threshold defines what is Black or White
    - Compact - 1 bit saved for each Pixel
    - OK for lines and text
- Gray Scale
    - Palate limited to shades of Gray (equal intensives of Red, Green and Blue)
    - 8-bit color depth – Shades of Gray in 256 steps
    - 16-bit color depth – Shades of Gray in 65,536 steps
    - Good for Black and White images (and lines and text)
- Color
    - Each pixel is broken down into three primary colors (Red, Green and Blue)
    - 24-bit color depth – each color has a 8-bit value (0 – 255)
    - 48-bit color depth – each color has a 16-bit value (0 – 65,536)
    - Good for images (and lines and text)

Image Size vs. Resolution

- Low resolution images cannot be enlarged
- If you plan to enlarge images you need to scan at a higher resolution
- Effective Resolution – Pixels per inch
    - The optimal Effective Resolution for a image to be printed is about 300 Pixels per inch
- Histogram – shows the number of pixels for each color
    - Most useful to photographers

Digital Image File Formats

- Lossless
    - No digital data is lost or discarded when creating the file
    - Tends to create large files
    - Used by archivists and preservationists
- Lossy – Some digital data is lost or discarded when creating the file
    - Creates more compact files
    - Degradation in image quality is acceptable for some uses
- TIFF – Tagged Image File Format
    - Lossless
    - Creates large files
    - Many browsers will not open TIFF images
- PNG
    - Performs lossless (i.e., reversable) file compression
    - Supports Transparent Images
- JPEG – Joint Photographic Experts Group
    - Lossy
    - Degree of compress can be varied
        - Less Compression -> Larger files
        - More Compression -> Smaller files
    - Does not change the resolution of the image
    - Compression is performed every time the file is saved
        - Each compression further degrades the quality of the image
    - Does not support Transparent Images
- RAW
    - A TIFF-like format created by some cameras and camera Apps
    - Need compatible software to read the files and save as TIFF, JPEG, PNG, etc..

File Conversion

- TIFF and PNG can be converted to JPEG
- JPEG can be converted to TIFF and PNG
    - But the damage done when the JPEG files was initially created cannot be reversed

Metadata

- o Data about the digital image
- o Saved with the image
- o Cameras add additional information
- o You can add text and tags as well
    - o Windows and Mac O/S allow you to access Metadata
    - o XnViewMP is a popular free software tool for managing metadata

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My website has additional information about this presentation, including links to a PDF version of this Syllabus as well as a PDF version of my PowerPoint Presentations:

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